Development of a Framework for Electronically-enabled Supply Chains: Channel Relationships and Firm Performance

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ABSTRACT

Advanced information technology (IT) has changed the way organizations manage their supply chains. Companies increasingly rely on IT to improve their supply chain process. This paper examines how electronically enabled supply chains affect channel relationships and firm performance. This paper reviews extant literature and develops a conceptual model of IT mediated relationships in business to business supply chains. The framework integrates resources-based view and transaction cost economics perspectives and argues that IT capabilities, which can be viewed as a firm’s resources, enhance its market and financial performances and this is mediated by the firm’s supply chain channel capabilities.

Keywords: Supply Chain Capabilities, Information Technology, Firm Performance, Electronic Integration

INTRODUCTION

The use of information technology (IT) in managing the supply chain process has drawn increasing attention in the corporate world. It has been argued that IT plays a very important role in managing inter-organizational relationships and enables firms to achieve more efficient and effective communication with their supply chain partners [1, 2]. However, although there are some promising and positive views about the impact of IT on business value, there has been a long debate on the contribution of IT on organizational performance, which is called the “IT productivity paradox” [3, 4]. This paradox argues that IT does not necessarily increase productivity or organizational performance. In actual fact, IT and adoption of a particular technology can be easily replicated by other firms [5], and consequently diminishes the prospects to develop sustainable competitive advantage [6].

Addressing gaps in the literature, this study explores the important research questions of whether and how IT impacts on firm performance in the context of supply chain relationships particularly in the business to business context. The aim of this study is to review and integrate different perspectives and theoretical bases relating to the impact of IT on supply chain relationships and firm performance. This study uses transaction cost economic and resource based view theories to develop a conceptual model of IT in managing supply chain channel relationships and enhancing business performance.
LITERATURE REVIEW

Although it is commonly perceived that IT is fundamental to a firm’s survival and growth, many researchers, managers and policy makers have difficulty in identifying the principal mechanisms linking IT to organizational performance [6-9]. Anecdotal evidence and case studies identified that effective and efficient use of IT is an important factor differentiating successful firm from their less successful counterparts [10-13]. Despite evidence from many case studies proposing that IT enhances productivity and performance [12-15], practical evidence from using large sample has not been as readily forthcoming. Indeed, many studies have indicated that, in some examples, IT investment has had negative dysfunctional effects on organizational productivity and performance [16, 17]. There is also evidence that several firms, concerned about falling behind on the technology curve, invest heavily on IT capabilities without deriving any benefits [18]. Thus, regardless of substantial investment in IT by companies, direct linkage between technology usage and enhancement in productivity and performance has been extremely elusive.

IT productivity paradox is a well-known concept which has been cited by many scholars in relation to the impact of IT on organizational performance particularly in SCM context [7, 19-32]. This paradox draws attention to the fact that IT does not necessarily increase productivity or business performance; indeed, IT can even be viewed as a commodity which can be easily replicated by competitors [33], and therefore reduces the prospects of developing sustainable competitive advantage. For instance, macroeconomic studies in the US acknowledged that even with growing IT investment, overall productivity statistics showed poor performance [28]. More recently, Devaraj and Kohli [34] argued that the conceptual problem relating to the productivity paradox of IT is that in many studies only IT investment, not actual usage, is considered.

In recent years, the number of studies about the impact of IT on supply chain relationship and performance are increasing. Some related issues is discussed in different disciplines such as in marketing [25], supply chain [35], information system (IS) [36] and strategy literatures [37]. On the other hand, empirical evidence on the issue is still fragmented and a comprehensive conceptual framework to integrate different theoretical perspectives is lacking in the literature [38, 39]. In particular, there is lack of academic investigation on how and why information technology can improve the management of supply chain channel relationships of firm and consequently lead to performance gains.

Firstly, regarding the dimensions of IT adoptions and IT capabilities in the supply chain relationship and performance literature, there is still no consensus. Researchers use different terminologies for inter-organizational technologies like internet and EDI, and different measurement such as EDI volume, depth, diversity, breath and embed for their contributions toward enhanced performance [40, 41]. For instance, some studies adopt electronic or virtual integration as a key IT resource. Kim et al. [25] conceptualize inter-firm systems integration, applied technological innovation and administrative innovation as three main IT resources in their study.

Arun et al. (2006) also conceptualized IT integration capability as a main IT resource which impacts on supply chain process integration and firm performance. Therefore, this determines
that the conceptualization of IT for IT resources is uncertain, leading researchers to conceptualize and use different terms for IT capabilities and resources terms.

Secondly, IT-mediated supply chain relationships and performance research centers around the direct or indirect relation argument between IT and performance. One of the ways to know how IT improves business performance is the emergent process-oriented approach [42, 43]. This shows that IT improves business performance through enhanced business processes, capabilities or structures. The majority of these studies are driven by the application of the resource based view theory in IT business value investigation [8, 44], which assert that IT by itself can not directly lead to enhanced business performance. It specifies that IT should interact with certain higher order organizational capabilities or business processes.

For example, Subramani [45] suggests and examines a model which investigates supplier benefits from IT in supply chain relationships. His research reveals that companies’ relationship-specific investments had an essential mediating role between patterns of IT appropriations and firm performance. Moreover, supply chain integration and dimensions such as coordination and collaboration have also been treated as important business processes which may mediate the impact of IT on supply chain performance [29, 31].

The aim of this study is to conceptualize and investigate the issues related to business value of IT in SCM. Although prior research has demonstrated that IT usage does have beneficial performance and productivity impacts, theoretical frameworks are yet to explain how and why these usages enhance firm performance. Thus, the goal of this paper is to provide a study that extends current knowledge on whether and how IT usage in supply chain channel capabilities impact firm performance.

**DESIGNING A CONCEPTUAL MODEL**

Different theoretical approaches have been used in IT-mediated supply chain relationship and value creation research. For example, transaction cost economic theory (TCE) is mainly applied in information system literature and recently, scholars have encompassed the RBV theory to investigate IT and business value [23, 25, 30, 36, 46] in the supply chain context. TCE companies view competition based on the costs of competing in the market place. If a company is to survive it must be able to produce at lower costs, therefore, the decision to go to market or hierarchy. While RBV focused companies view their priorities by competing through the competencies and capabilities that they have at their disposal. Although it may sound as though these approaches are opposite to each other this is clearly not the case. It would be difficult to see how one could exist without the other. Any strategic approach to supply chain management should combine one of these approaches with a greater emphasis on either RBV or TCE [47].

Several studies have used TCE to argue how advancement of IT changes inter-organizational relationships and governance structures. For instance, Malone et al. [48] investigate IT on coordination costs in terms of searching and communicating with transacting parties. Gurbaxani and Whang [49] and Clemons et al. [50] both recommend that IT decreases transactions such as
the contractual hazards of shirking and opportunism through improved monitoring and decreased specificity in coordination. Yao et al. [46] have argued that electronically-enabled supply chains have the potential to improve organizational and supply chain-wide performance by enhancing transaction efficacies and coordination effectiveness. Subramani [45] proposes that IT investment increases firm competitive advantage, whilst overall there is a limited number of studies that investigate IT-business value empirically.

On the other hand, most of RBV-based studies attempt to identify and categorize different IT related resources and examine their impact on business performance. For instance, Bharadwaj [9] describes IT capabilities as “the ability to mobilize and deploy IT-based resources in combination or co-present with other resources and capabilities”. He classifies three types of IT-capabilities:

1- IT infrastructure
2- Human IT resources
3- IT-enabled intangible resources.

Although several studies appear to link different attributes of competitive advantage with the application of RBV to business-value some ambiguities and confusion exist. Firstly, the uncertainty in conceptualization of IT resources leads scholars to conceptualize and apply various terms for IT resources or capabilities terms. Secondly, different business processes and capabilities which interact with IT capabilities in the process of value creation have also been addressed. Finally, still there are some ambiguities in how various IT resources interact with other capabilities and business processes to create competitive advantage.

Therefore, this research integrates two different streams of theories and creates a conceptual framework. The framework illustrates whether and how IT capabilities affect firm performance in supply chain relationships (channel capabilities: information sharing, SC coordination and SC responsiveness). In this study, the conceptual framework is developed from the perspective of the buyers’ who explore electronic channel interactions with their main suppliers. Besides, this research mainly focuses on the electronic integration (EI) in the business to business (B2B) relationship. It is drawn on Kim and Umanath [51, 52] electronic integration and focuses on electronic information transfer (EIT) which serves as the infrastructure for inter-organizational business and process integration.

As depicted in figure 1, the proposed conceptual framework is rooted in the emergent stream of RBV in IT-business value research and complemented by TCE. According to the RBV, it is argued that companies with specific IT capabilities which are rare, valuable and not easily substitutable can increase specific inter-organizational capabilities and processes. Furthermore, drawing from TCE, these IT capabilities (specifically electronic integration) will overcome information asymmetries by making information more visible to market participants, leading to firm’s supply chain relationships (information sharing and SC coordination) less subject to opportunity behaviour [53, 54].

This paper focuses on IT capabilities which can effectively and efficiently reinforce inter-organizational processes and restructure exchange relationships [8, 9], electronic integration,
human IT resources and complementary organizational resources. These are in line with Bharadwaj [9]’s classification of IT capabilities which include IT infrastructures, human IT resources and IT-enabled intangibles.

With respect to business processes and structures dimensions which mediate the effect of IT capabilities on business performance, this study focuses on channel relationships which encompass information sharing, SC coordination and SC responsiveness. These have been discussed in the literature as significant process and structure mediators of IT impact on firm performance [25, 30]. According to the RBV perspective, information sharing, SC coordination and SC responsiveness capabilities are inter-organizational channel capabilities. Market and financial performance has been widely treated as firm performance metrics in prior studies [25, 30, 55, 56]. Therefore, the both firm’s market and financial performance are adopted as the ultimate outcome variables in this study.

Figure 1: Research conceptual model
IT capability dimensions

Electronic Integration - Wang et al. [2] assert that electronic integration (EI) relates to the degree to which supply chain relevant activities among channel members are carried out by inter-organizational information system. Electronic integration can encompass a variety of inter-firm channel activities from loose transaction activities to tightly coupled ERP-to-ERP connections to facilitate activities such as collaborative demand planning and fulfilment [57, 58] and therefore can show varying results on business process and structures in supply chain exchange relationship.

According to Venkatraman and Zaheer [59] EI can be defined as “the integration of business processes of two or more independent organizations through the exploitation of the capabilities of computers and communication technologies”. Most of the time EI involves interaction with the resources controlled by the partner firm and needs considerable mutual adoption. Therefore, any meaningful measurement instrument should capture the degree of electronic integration in different dimensions of the business processes among trading partners [2, 51, 59]. In an explicitly cooperative relationship, decisions are coordinated between economic activities through processes and information that are specific to the exchange [51, 52].

Information asymmetry happens, while either partner in the relationship has privy to information specific to the supply chain relationship that the other do not. Hence, the asymmetries raise transaction risk while integrating decisions and operation in the trading partnership [60, 61]. Information asymmetry can cause opportunistic behaviour such as shirking by trading partners. The complexity in measuring the particular contribution of inputs in generating outputs leads to an opportunity for performance shirking by the supplier. If the buyer is not able to monitor the status of the supplier’s production process (the production capacities, inventory levels, shipping/delivery schedule, quality of the products being produced, etc.), the suppliers can decrease their effort level. Besides, opportunism can happen in absence of appropriate number of suppliers, as this situation raises the dependency of a buyer on a specific supplier. Therefore, transaction risk is the result of difficulties in performance monitoring [52]. Information asymmetry can also be decreased once partners freely share relevant information for the relationship; for example: electronic exchange of production/sales data, sharing promotion plans, vendor-managed inventory (VMI), etc [51, 62].

Transaction cost economics (TCE) provides the fundamental proposition that electronic integration will overcome information asymmetries by making information more visible to market participants, leading to relationships less subject to opportunistic behaviour [54]. The basic concept for electronic transactions proposes that information technologies should allow closer integration of adjacent steps in the supply chain [48]. The electronic integration effect provides closer combination of the processes that create and use information. Real time and accurate demand information, together with visualization of inventory throughout the distribution process, facilitates reducing process and cycle time variance, data errors, and safety stock and attaining better channel coordination for firms [63]. Many studies recommend that information sharing activities among companies in a supply chain can mitigate the information distortion, known as the bullwhip effect [46, 64, 65]. Bakos’ [66, 67] studies about electronic hierarchies and electronic markets, determines that electronic markets decrease a buyer's search
costs, promote price competition, and weaken the market power of sellers. Electronic hierarchies decrease coordination costs by reducing inventory and monitoring costs. Williams also determined that electronic linkages enable supply chains to efficiently coordinate activities, share information, and improve customer responsiveness [68].

From the RBV perspective, electronic integration is an outside-in resource [55, 69] which can create superior firm performance than other inside-out IT resources such as advanced infrastructure [44]. Some studies have provided empirical evidence that electronic integration enhances channel capabilities such as coordination and information sharing [25, 30]. Hence, this research argues that electronic integration can be treated as a key IT resource which bridges both TCE and RBV perspectives. Overall, this study identifies that electronic integration is one of the most crucial IT capabilities in supply chain B2B context. Firms are likely to achieve effective and desired levels of channel coordination and information sharing through superior levels of electronic integration with their partners such as distributors and suppliers.

**Human IT resources** - Technology is not able to operate in a vacuum. Adequate and competent technical skills and knowledge are necessary for managing and leveraging advanced IT. In previous studies, Human IT resources including technical skills and managerial skills have been considered as essential IT capabilities [8, 9, 70]. Byrd and Turner [71] determined that IT professionals with higher technical and managerial skills led to better IT infrastructure flexibility, a feature of strategic importance to IT and business managers [72]. They also determined that these skills enhanced the competitive advantage in main business management areas [27]. Harkness et al. [73] ascertained that Bose Corporation had to raise the depth and scope of the skills of its IT employees in order to develop an integrated infrastructure for better supply chain relationships. Mata et al. [74] mentioned that the skills of the IT professionals were essential in order to maintain a sustained competitive advantage from an organization’s IT resources.

From a RBV standpoint, several studies have depicted that human IT resources are rare and difficult to acquire and therefore could be a source of a firm’s competitive advantage. For instance, in an empirical research by Kim et al. [25] in the supply chain context, the accumulation of internal IT skills and knowledge in the company enhances inter-firm coordination and information exchange directly. Hence, in this study, human IT resources is consider as the main IT capability which can help companies successfully manage their supply chain activities and achieve greater business value.

**Complementary organizational resources** - While it is possible to apply IT for improved organizational performance with minor organizational changes [75], successful implication of IT is regularly accompanied by significant organizational change [76-78]. In other words, in the context of a firm’s IT capability, a question that is becoming gradually more important for many senior managers is “how do investments in technology create superior intangible resources for the firm?” [9]. Once synergies among IT and other firm resources exist, it can be called the complementary organizational resources. The RBV studies provide guidance concerning the categorization of complementary organizational resources. Barney [79] classified that complementary organizational resources as non-IT physical capital resources, non-IT human
capital resources, and organizational capital resources. Some complementary organizational resources have been considered in previous studies. For instance, Bharadwaj [9] clarifies customer orientation, knowledge assets and synergy are three IT-enabled intangibles. Powell and Dent-Micallef [6] in their empirical study identify that companies can gain advantages by using IT to leverage complementary human and business resources such as strategic planning/IT integration, supplier relationships.

This study focuses on some main IT implication and usage arrangements as complementary organizational resources which are needed to support supply chain relationships such as electronic integration in channel capabilities settings. In building electronic links in order to coordinate and share information with trading partners and support customers, firms face greater challenges and difficulties from the technology implication and usage [27, 28, 80]. Therefore, some IT implication arrangements such as IT integration, top management support of IT and customer orientation are required to support IT adoption in supply chain activities [27, 38, 81, 82].

(1) **IT integration**- IT scholars, consultants, and executives have universally indicated that companies should integrates IT with overall strategic planning efforts [83-88] and therefore it includes IT-strategy integration as a potential advantage-producing complementarity [6]. Clemons [89] asserts that “the importance of selecting strategic opportunities, applications that are consistent with and support the firm’s strategic objectives, requires real links between management information system and strategic planning. It also requires the ability to seek out to find, and to recognize these strategic opportunities”. In addition, Rockart and Short [90] mentioned that not only does planning improve IT effectiveness, however IT may provide the systems and information that can make planning more effective, creating a symbiotic IT-planning relationship.

(2) **Top management support**- Top management support (CEO commitment) has been investigated in many areas of IT implementation and IT business research [91] and has long been acknowledged as a main factor to success. It should include both involvement and participation. The importance that the top management executives place on IT implementation and usage reflects in various ways. Top management involvement could be considered by the level of funding for IT. It may also encompass the of technology transfer throughout the firm. In fact, several IT studies have indicated the significant of top management executives to the implementation, use, and success of IT in firms [92, 93], IT case studies [94]; and empirical studies [95] have promoted and verified its value.

(3) **Customer orientation**- The importance of customer orientation is apparent in almost every industry, and the positive impact of customer orientation on organizational performance has been widely acknowledged [96-98]. Customer orientation has been specified as an organization’s ability to adequately understand target buyers with the aim of continuously creating superior value for them [81, 97]. Alternatively, it has been defined as the implication of a continuous, proactive disposition toward meeting customer’s requirement [99-101]. An important part of customer orientation is sensitivity to and foresight about the main forces that shape a market and industry. A customer oriented firm is more ready to anticipate future customer requirements and
have a long term vision. Respectively, such a firm is likely to have a more proactive approach toward the implication of new technologies, including those related to managing supply chain relationships.

In achieving high levels of customer orientation, companies have ascertained IT to be a crucial factor. Indeed, customer orientation strategies such as customer relationship management (CRM) are based on the core IT capability of the company [9]. For instance, Prudential recently invested in an IT system designed to improve its knowledge of customers across all business units [102]. Likewise, a customer oriented firm would seek to coordinate better with suppliers towards developing a supply chain that is responsive in all parts to feedback from the marketplace. While customer orientation places a high priority on continuously finding ways to deliver greater customer value, an enhanced customer orientation should, in turn, lead to enhanced boundary spanning activity within the firm [100]. A higher customer orientation should lead to more intensive implication of IT initiatives in communication processes. Similarly, a customer oriented firm is more likely to focus efforts and resources to satisfy customer requirements and to implement a proactive disposition toward innovations which facilitate efficient customer transactions and robust customer relationships. As an example, such a business tends to implement online order taking [81, 103].

**Supply chain channel capability dimensions**

Organizational capability is an outcome of knowledge and resource integration within and across firms [104]. This study focuses on examining one unique set of organizational capabilities—channel capability, and their mediating role between IT-related resources and firm performance. Channel capability refers to the ability of an organization to identify, utilize, and assimilate resources and other capabilities to derive efficiency in channel activities and, ultimately, sustainable competitive advantage [9, 104, 105]. This research investigates inter-firm information sharing, supply chain coordination, and supply chain responsiveness as channel capabilities [25]. These dimensions are selected because they represent most of the important activities involved in the supply chain process. Each of these dimensions demonstrates an ability to perform inter-organizational activities which are required in supply chain relationships. Furthermore, they underline the dynamic nature of the channel capabilities that enable a company to learn and respond to environmental changes [30, 105, 106]. It is argued that channel capabilities represent a higher level (if not the highest) in the hierarchy of organizational capabilities [107], where they need a broad range of knowledge integration as indicated above. According to Collis [104] and Grant [107] these types of capabilities are harder to achieve and therefore enjoys a higher level of protection against competitive imitation. It acquires the virtues of a valuable source of sustained competitive advantage [79].

**Information sharing**—Information sharing refers to the ability of a firm to share knowledge with channel partners to serve downstream customers effectively and efficiently. Such knowledge would encompass any changes in the business environment, for example market and customer preferences. Timeliness, accuracy, adequacy, completeness, and credibility of information are
among the multiple dimensions of information sharing [108]. In order for channel partners to utilize the information effectively and efficiently, it should be exchanged when it required. It requires to come from a credible partner or source and in an adequate format, without missing any elements [108].

An effective information sharing has been recognized as one of the most essential abilities in the supply chain process [109]. Information sharing is usually achieved through the enhanced use of information technology or a closer integration among supply chain partners [110]. However, it is argued that information sharing by itself does not offer much benefit. Alternatively, it contributes to channel capabilities such as coordination and responsiveness of the partnership [1]. Truman [111] and Lewis [112] cited that channel partners share more information in an attempt to enhance coordination. The purpose of efficient electronic linkage is to collect, interpret, filter, store, and share data through effective information sharing within and across partners to improve efficiency in coordination activities [111]. As an example of enhancing responsiveness through information sharing, Bechtel indicated the requirement for precise information about real customer demand especially for product with shorter life cycles [113]. Thus it is important to create transparency in the logistics information system. With tightly coupled supply chains relations through sharing information in real-time about consumer demand and component supplies, responsiveness can be improved.

**Supply chain coordination** - According to Dyer and Singh [114] a firm needs to develop effective coordination with its supply chain partners with the aim of maximizing the potential for converting competitive advantage into profitability. Transactions are an essential element of supply chain relationships, and coordination activities for such transactions are critical for efficient channel activities [50]. Supply chain coordination in this research is considered as a channel capability, and conceptualized as the extent to which a company coordinates with channel partners efficiently [48, 115, 116]. Coordination with supply chain partners encompasses the coordination of materials, money, manpower and capital equipment from order taking to order follow-up [117]. In other words, inter-firm coordination ranges from the collection of product- and price-related information such as inventory level, new product launch, and pricing, to order follow-up activities including order confirmation and shipment tracking.

Few studies have investigated the degree to which supply chain partners coordinate their process, yet some instances can be found in related literature. For instance, Burbidge [118] clarifies how misaligned re-order levels can cause demand variability and uncertainty in supply chains. Further, Li and Liu [119] reveal that supply chain members can benefit from a coordination of quantity discount policies. Vendor management inventory is the other recent development, an arrangement under which suppliers take responsibility for maintaining stock levels at their customers’ sites, so improving their customers of re-ordering decisions [120]. Lee [121] by using the computer industry as an example, described the alignment of value adding task in some supply chains. Collins et al. [122] explain how similar shifts in the automotive value chain can contribute to enhanced supply chain responsiveness and general performance by leveraging core competencies and realigning complexity.
IT in supply chain communication can help efficient coordination activities to the owning firm by either decreasing coordination costs or improving operational efficiency and the quality of the coordination activities at the same cost [112, 115, 117, 123-126]. Especially, in the context of electronic hierarchy where a close relationship is critical [48], companies should be able to improve efficiency in coordination as their IT for supply chain communication system enhances [50]. Shin [115] presents an empirical study for supporting the positive effect of IT on supply chain coordination. Likewise, Clemons and Row [50] claim that “IT reduces the cost of coordination, leading firms to coordinate more”. In general the literature confirms that implantation of advanced IT enables supply chain members reduce coordination costs related to logistics activities [112, 127].

Supply chain responsiveness- Supply chain responsiveness in this research is defined as the extent to which the firm reacts cooperatively to changes in the environment and market quickly and effectively [128]. It elicits the dynamic nature of a company’s channel capabilities, which enable a company to develop and renew company’s specific competencies and to better react to shifts in the environment [104, 106]. In modern market, reliable, efficient, and collaborative response from the entire supply chain is necessary for success [129] and using of IT especially electronic integration among supply chain partners are expected to be critical factors [124, 130]. This means, the utilization IT in supply chain could lead to improvement of firm’s responsiveness to market needs and bringing the right products to the right place, in the right time in order to gaining competitive advantage [131]. According to Sinkula et al [132] the ability to take actions and to react consequently to information gathered is the ultimate learning experience. Therefore, this study considers supply chain responsiveness as one of the main dimensions of firm channel capabilities.

In a debate of how technology has effect on firm capability, Clemons and Row [50] asserted that “just-in-time inventory techniques with key suppliers or customers are reducing channel inventories and improving system responsiveness”. That is an efficient electronic integration enhances responsiveness of the partnership for which the system is deployed by helping channel members accommodate market changes or customer demands in a timely manner through efficient information exchange and coordination activities [25, 133]. Thus, this study argues that information sharing and coordination that are improved by IT usage among channel partners facilitate supply chain responsiveness.

Firm performance dimensions

As a result, companies that are successful in creating superior IT capability in turn enjoy superior firm performance. In this study, the supply chain channel capabilities (Information sharing, SC coordination and SC responsiveness) serve as a mediating role between IT related resources and firm performance [30, 104]. This research examines two performance variables: marketing performance and financial performance.

Market performance- In context of this study, IT capabilities are expected to affect market performance positively through their influence on channel capabilities. Information flows
facilitated by communication technology can potentially enhance the sales volume by reaching customers directly and promptly whenever a new product is introduced, and by tapping into markets that were inaccessible on account of distribution or other infrastructure constraints [81]. A good communication system should help companies respond to customer requests [129] and outperform in the market through on time delivery, efficient ordering procedures, customer alertness, timely assessment of customer requirements [134], provide better after sale service, and more broadly market orientation [1, 25, 135]. Lewis [112] argues that IT allows companies to engage in “large scale tracking of customer preferences” which should be associated with stronger channel capabilities, including information sharing, coordination and responsiveness. For example, offering a preferred type of product to the customers at the right time through superior IT capabilities will help expand market share and increase sales of the supply chain [127, 133].

**Financial performance-** According to Bharadwaj [9] superior IT capability improves financial performance by bolstering firm revenues and/or decreasing firm costs. Supply chain channel capabilities can potentially improve a firm’s financial performance through a cost advantage over competitors. Information sharing among trading partners may decrease demand uncertainty, and the cost of inventories in the process of matching supply with demand in the supply chain relationships [136]. Lin et al [137] argue that by improving the coordination among supply chain partners, firms can produce and deliver products and services to customers at lower cost and higher speed. Besides, seamless supply chain communication technologies simplify the organizational process and decreases lead times with suppliers [138]. It allows a company the ability to adjust its strategies ahead of competitors when opportunities arise. At the end this can enhance shareholder value due to flexible business processes [139].

**Control variable-** Organization size can have an important impact on firm performance. Larger organizations could derive more synergy effect from human, communication technologies and financial resources that lead to better performance [140]. Therefore, size of the organization which is measured by employee number and annual sale is included as a control variable in this study while the main effect of channel capabilities will be tested on firm performance. This will help to identify the nature of relationship among channel capabilities and firm performance more effectively.

**CONCLUSION**

This literature review examines, synthesizes, and integrates extant research relating to IT capabilities, supply chain channel capabilities, and firm performance. The conceptual framework presented in this study is derived by integrating diverse perspectives of IT and organizational performance, and combining two theoretical approaches, TCE and RBV. This framework serves as a basis for answering our major research questions, whether and how firms that implement IT systems into their supply chain activities can create competitive advantage and enhance their performance.
This argument is highly controversial and adds to an ongoing debate about the vague value and ambiguous nature of IT in B2B contexts. Some scholars propose that IT does not matter because IT is in fact a commodity, as the advantage it may provide only results in short-term gains for the firm [33]. However, others argue that it is the specific IT capability embedded into the B2B exchange process, which empowers firms and contributes to sustainable competitive advantage and increase firm performance.

Implementing IT into firm’s value chain operations is not a simple task, but needs a lot of effort. This research argues that the adoption of IT systems alone is not sufficient to support firms in their supply chain relationships. Indeed, electronic integration, complemented by human IT resources and complementary organizational resources, can reinforce and restructure specific business processes and structures which are referred to in this study as channel capabilities and include information sharing, SC coordination and SC responsiveness. This in turn can lead to greater firm financial and market performances.
References


